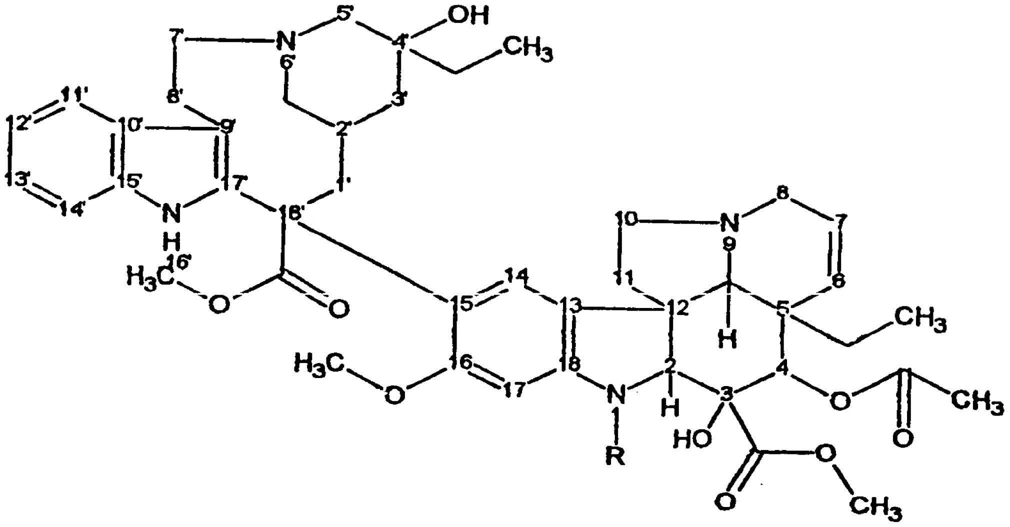


R=CH3=vinblastine

R=CHO=vincristine

FIG. 1

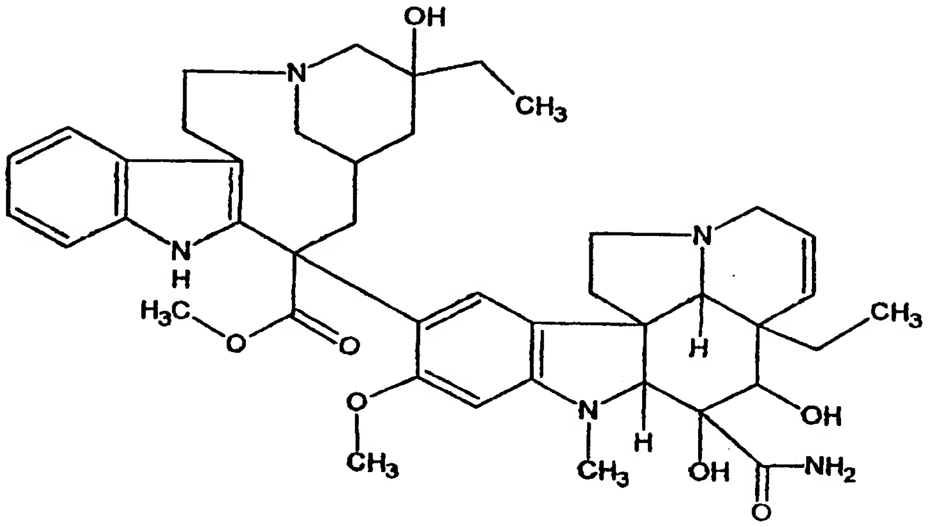


FIG. 2

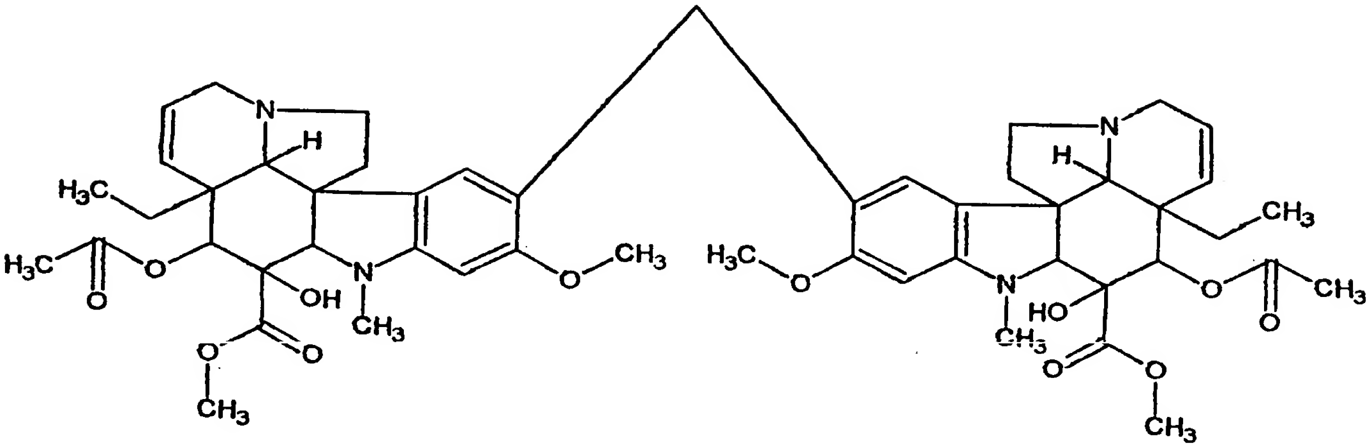

N
H
H₃C
H₃C
O
O
OH
N
CH₃
O
O
CH₃
O
CH₃
H₃C
O
N
H
CH₃
HO
N
CH₃
O
CH₃
O
O
O
CH₃

FIG. 3

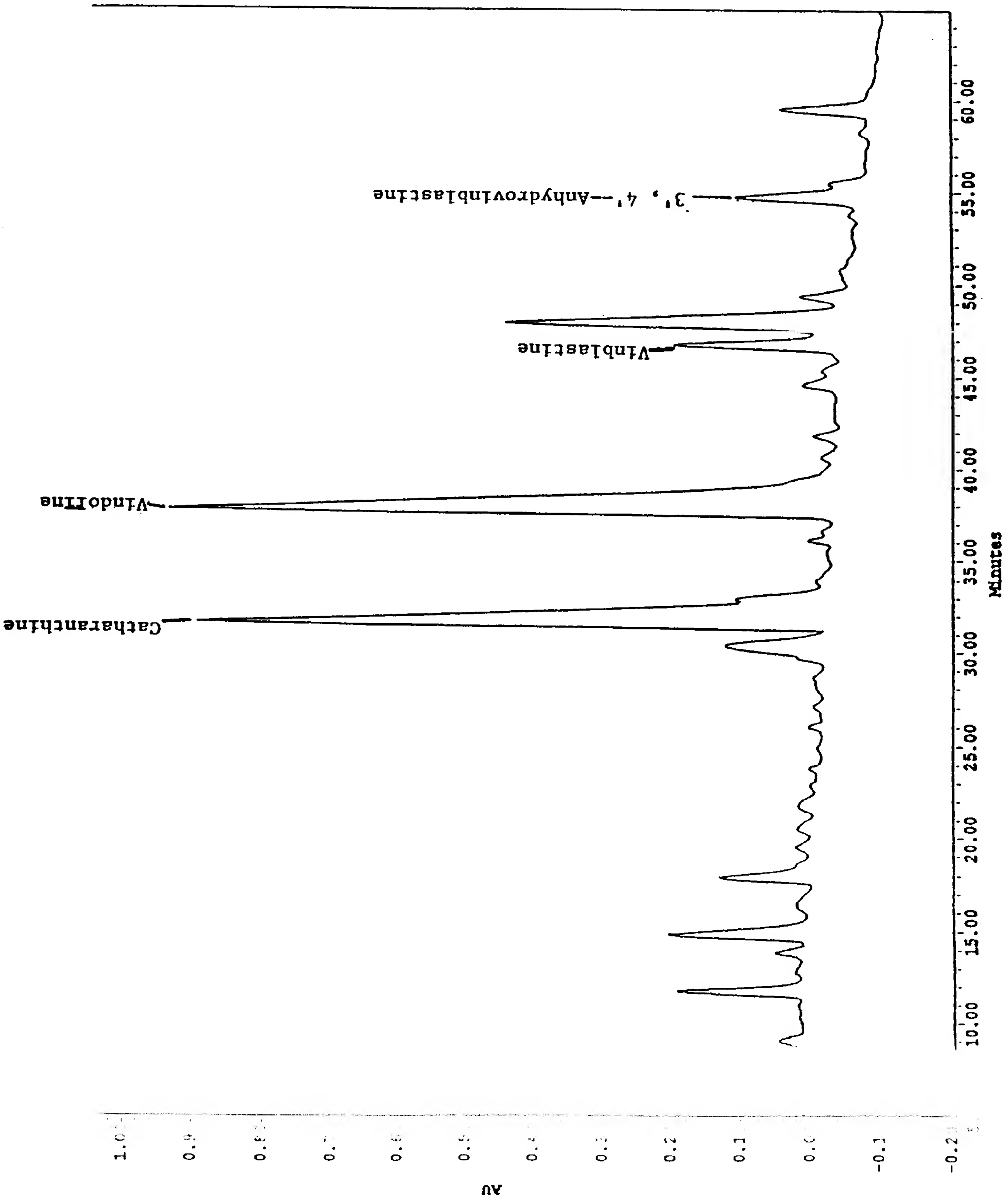

Catharanthine
Vindoline
Vinblastine
3', 4'--Anhydrovinblastine
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
Minutes
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
AU

FIG. 4

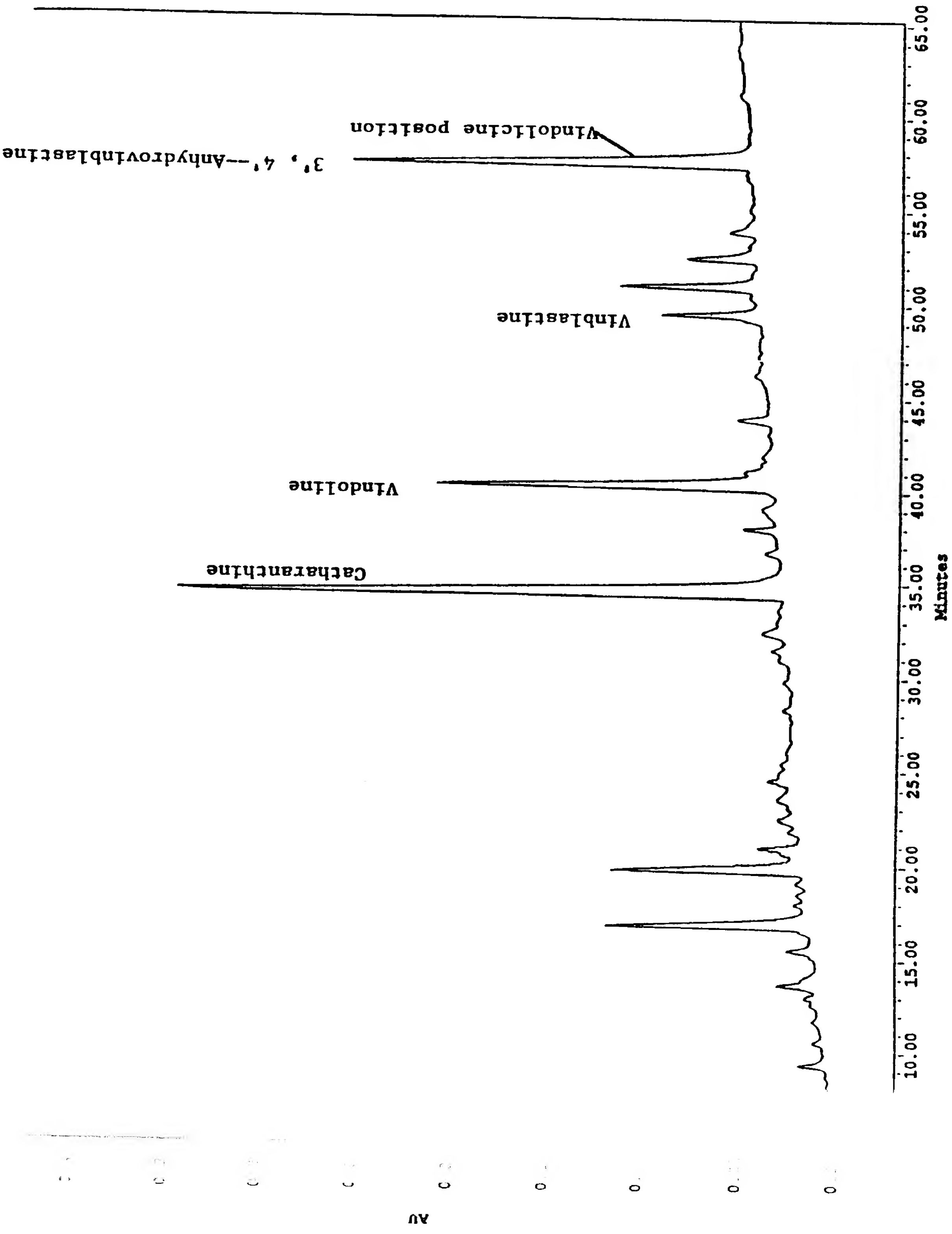
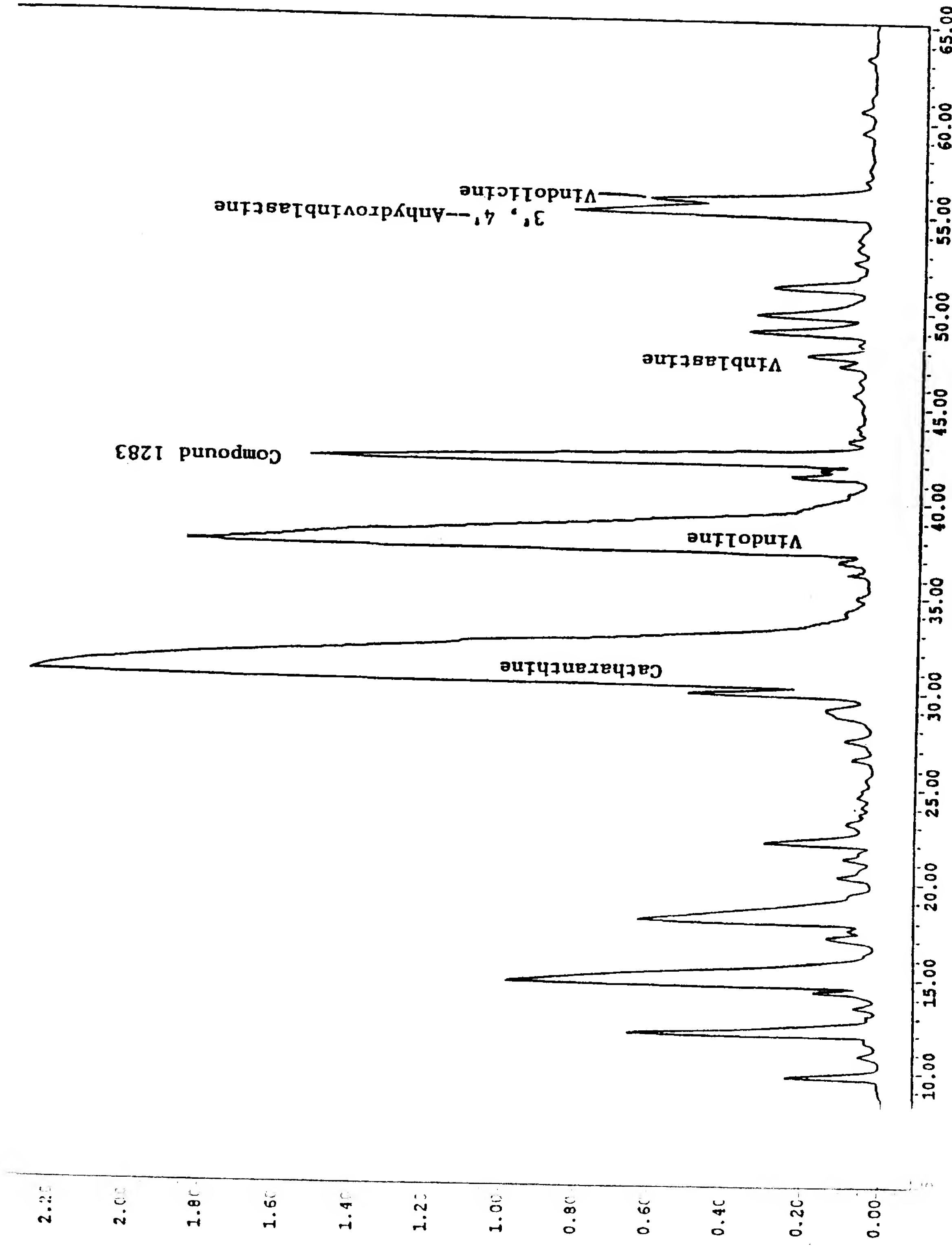

3', 4'--Anhydrovinblastine
Vindolicine position
Vinblastine
Vindoline
Catharanthine
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
65.00
Minutes
AU

FIG. 5



Minutes

FIG. 6

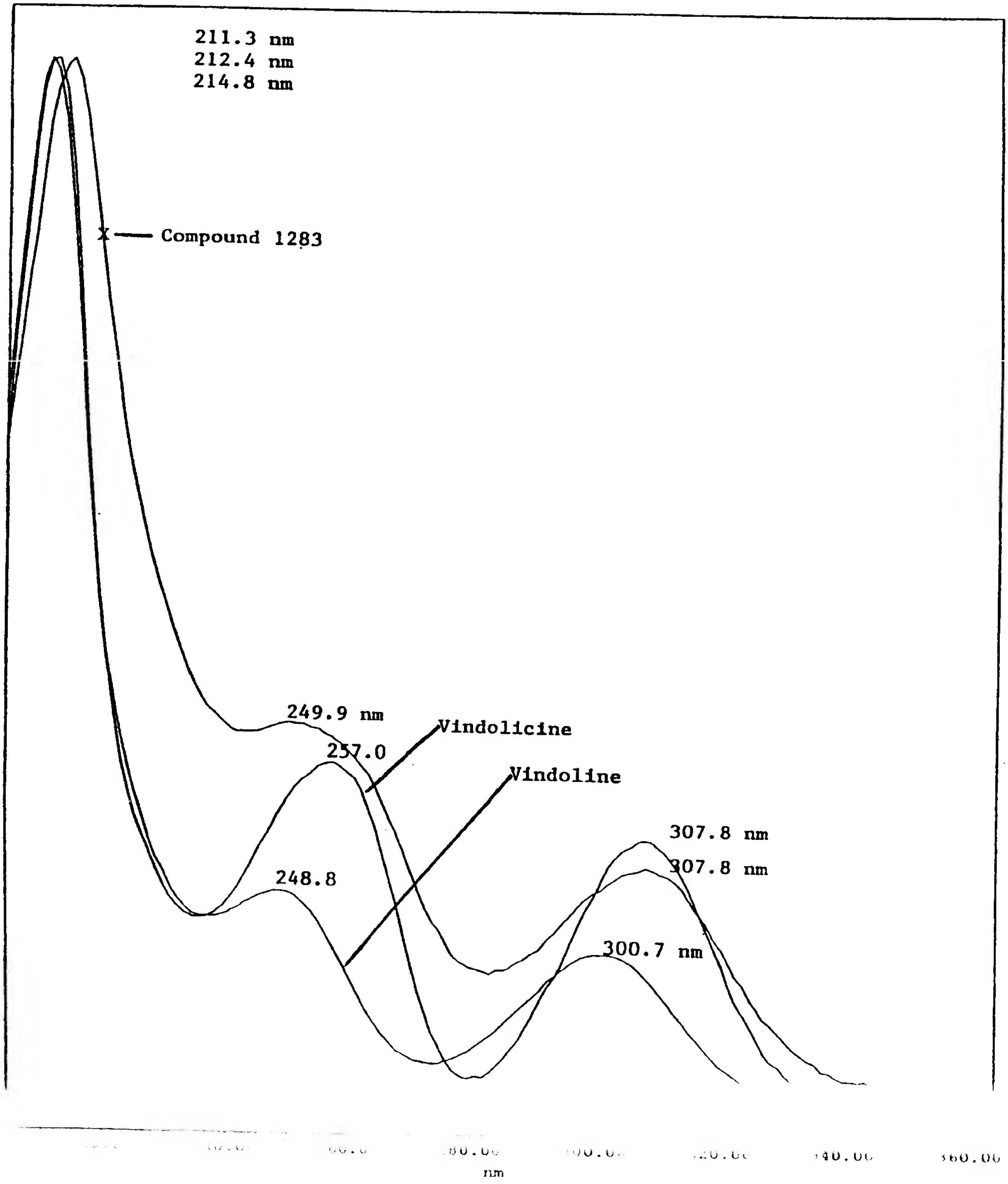

211.3 nm
212.4 nm
214.8 nm
Compound 1283
249.9 nm
Vindolicine
257.0
Vindoline
248.8
307.8 nm
307.8 nm
300.7 nm
60.0
80.00
00.0
20.00
340.00
360.00
nm

FIG. 7

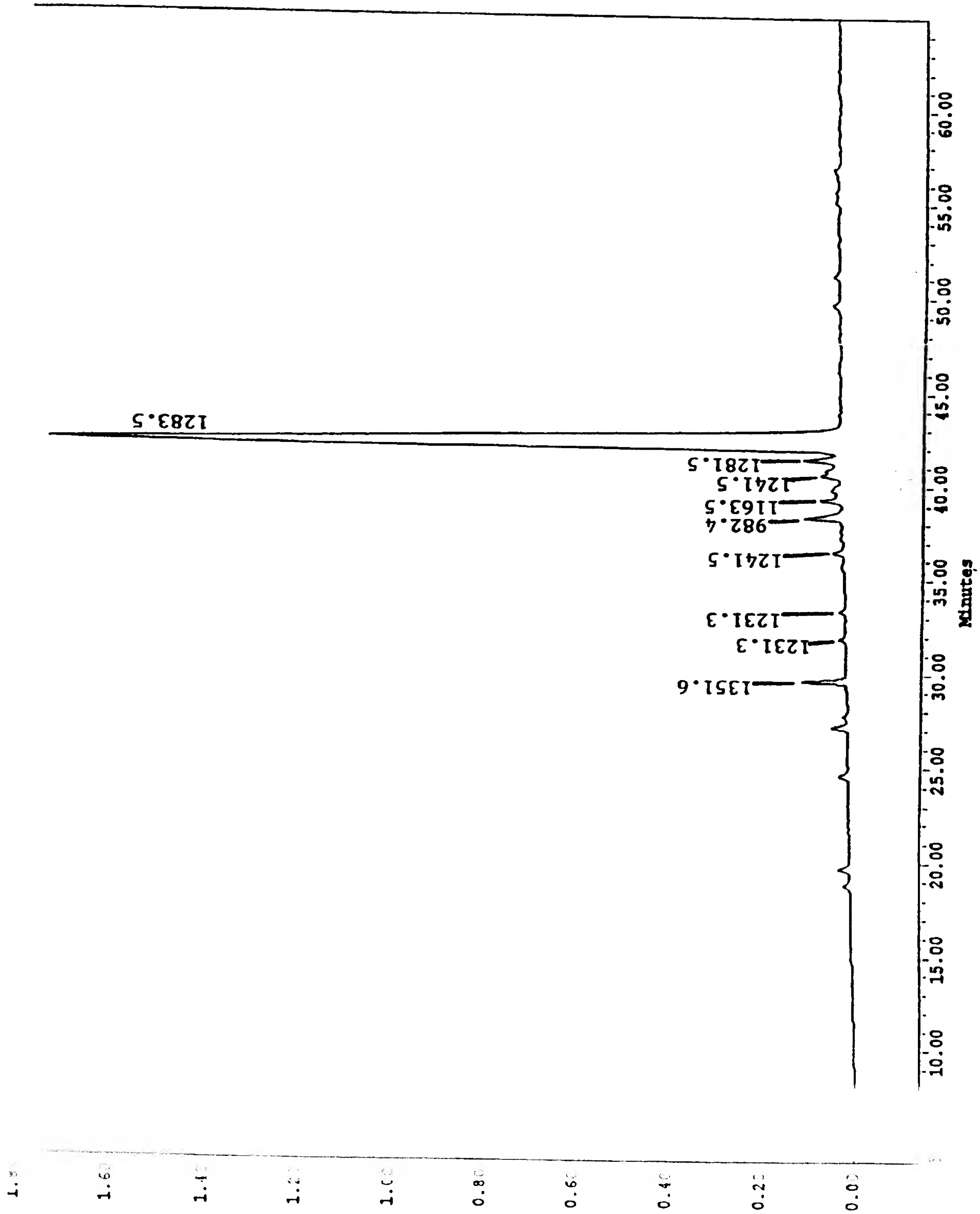

1283.5
1281.5
1241.5
1163.5
982.4
1241.5
1231.3
1231.3
1351.6
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
Minutes
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
AU

FIG. 8

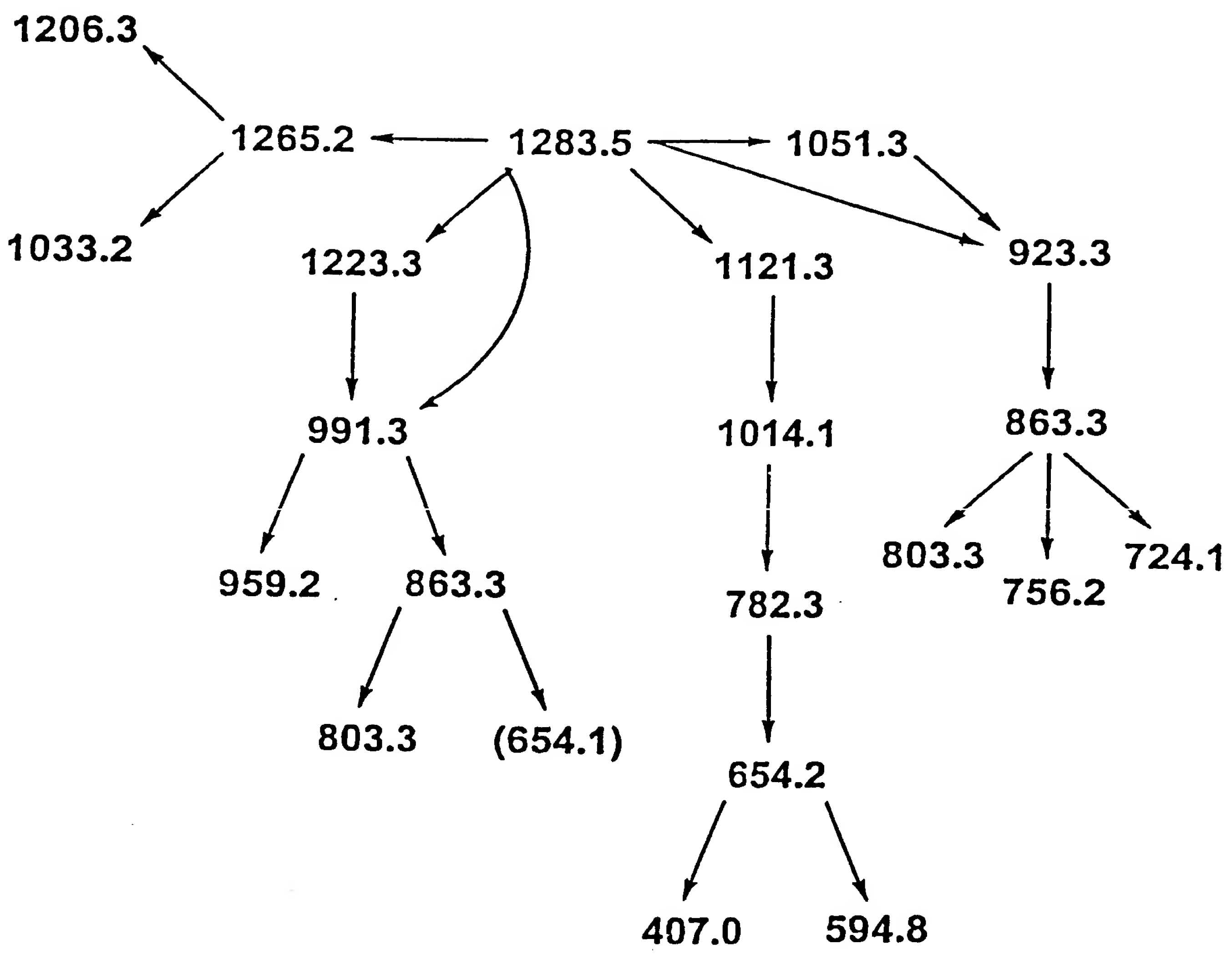

1206.3
1265.2
1283.5
1051.3
1033.2
1223.3
1121.3
923.3
991.3
1014.1
863.3
959.2
863.3
803.3
756.2
724.1
782.3
803.3
(654.1)
654.2
407.0
594.8

FIG. 9

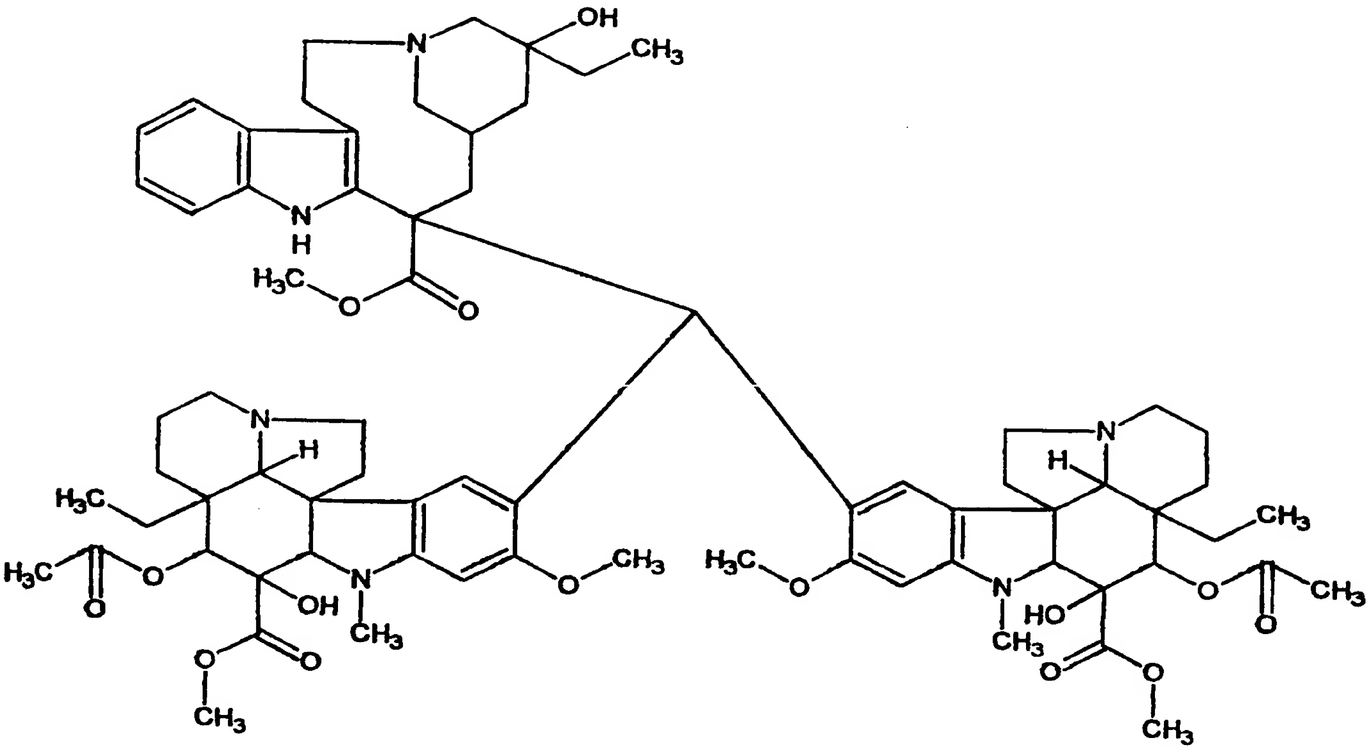


FIG. 10

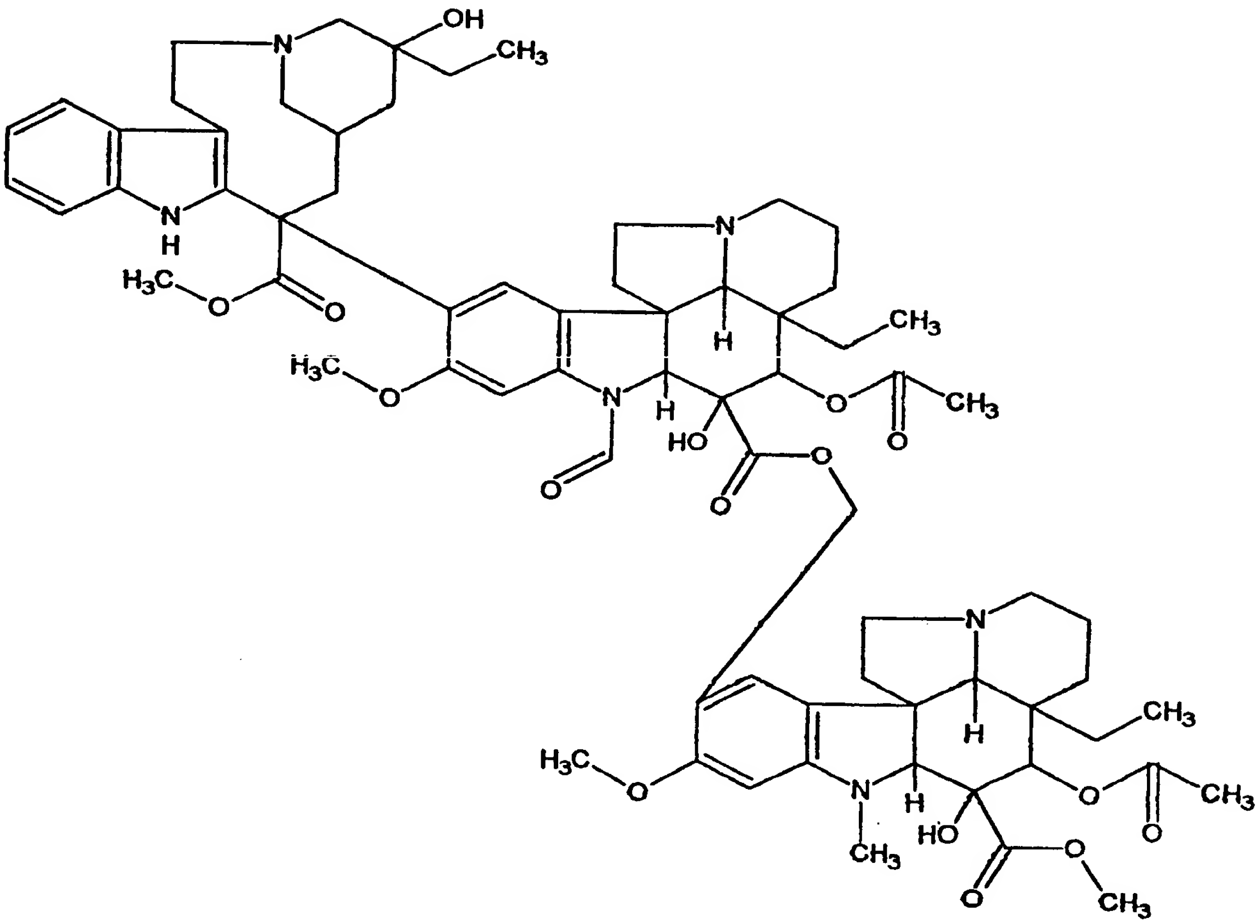

OH
CH3
N
N
H
H3C
O
O
H3C
O
N
H
H
CH3
O
CH3
O
HO
O
O
O
N
H
CH3
H3C
O
N
H
CH3
HO
O
CH3
O
O
CH3
O

FIG. 11

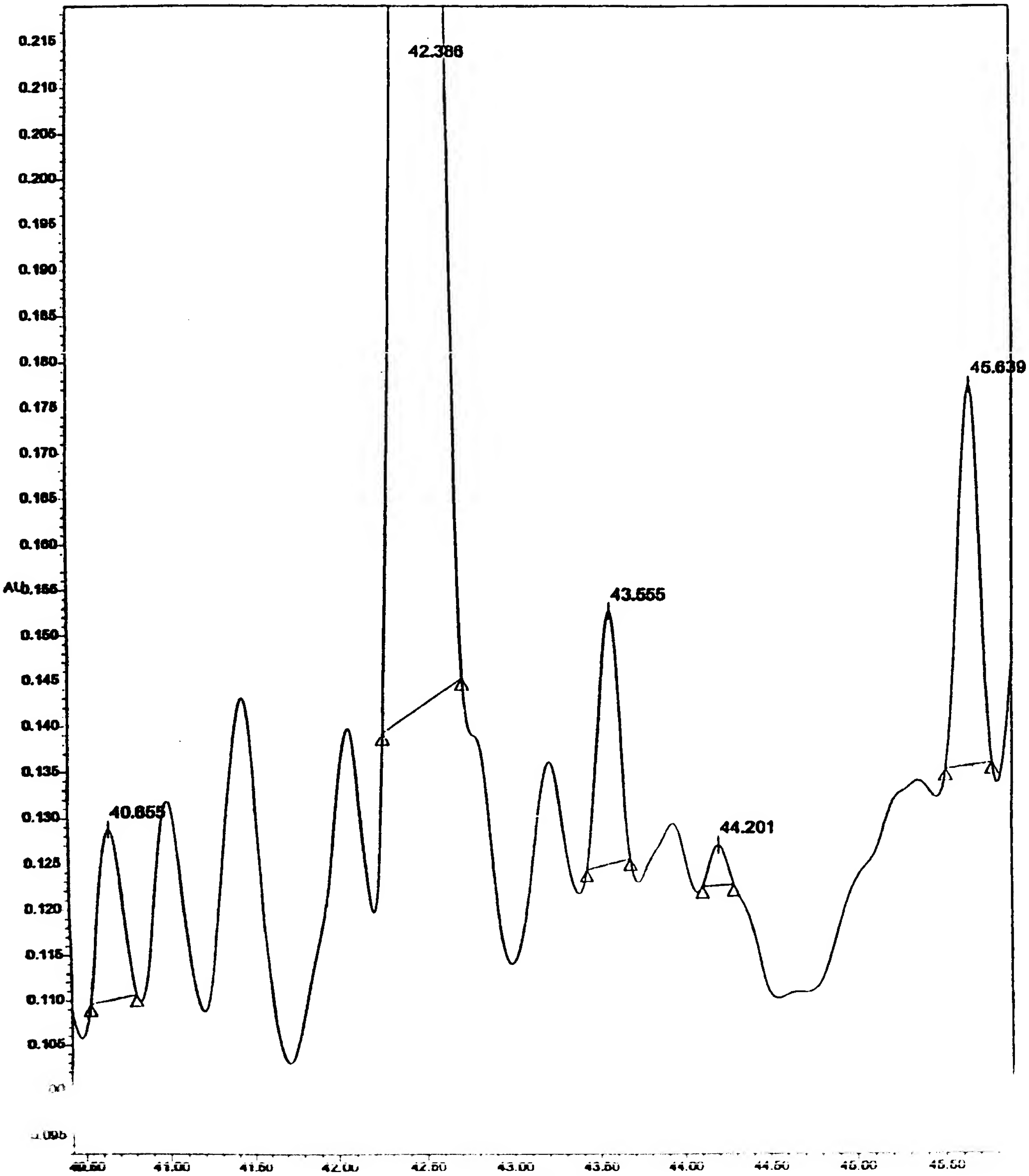

0.215
0.210
0.205
0.200
0.195
0.190
0.185
0.180
0.175
0.170
0.165
0.160
AU
0.155
0.150
0.145
0.140
0.135
0.130
0.125
0.120
0.115
0.110
0.105
.00
0.095
40.50
41.00
41.50
42.00
42.50
43.00
43.50
44.00
44.50
45.00
45.50
Minutes
40.655
42.386
43.555
44.201
45.639

FIG. 12

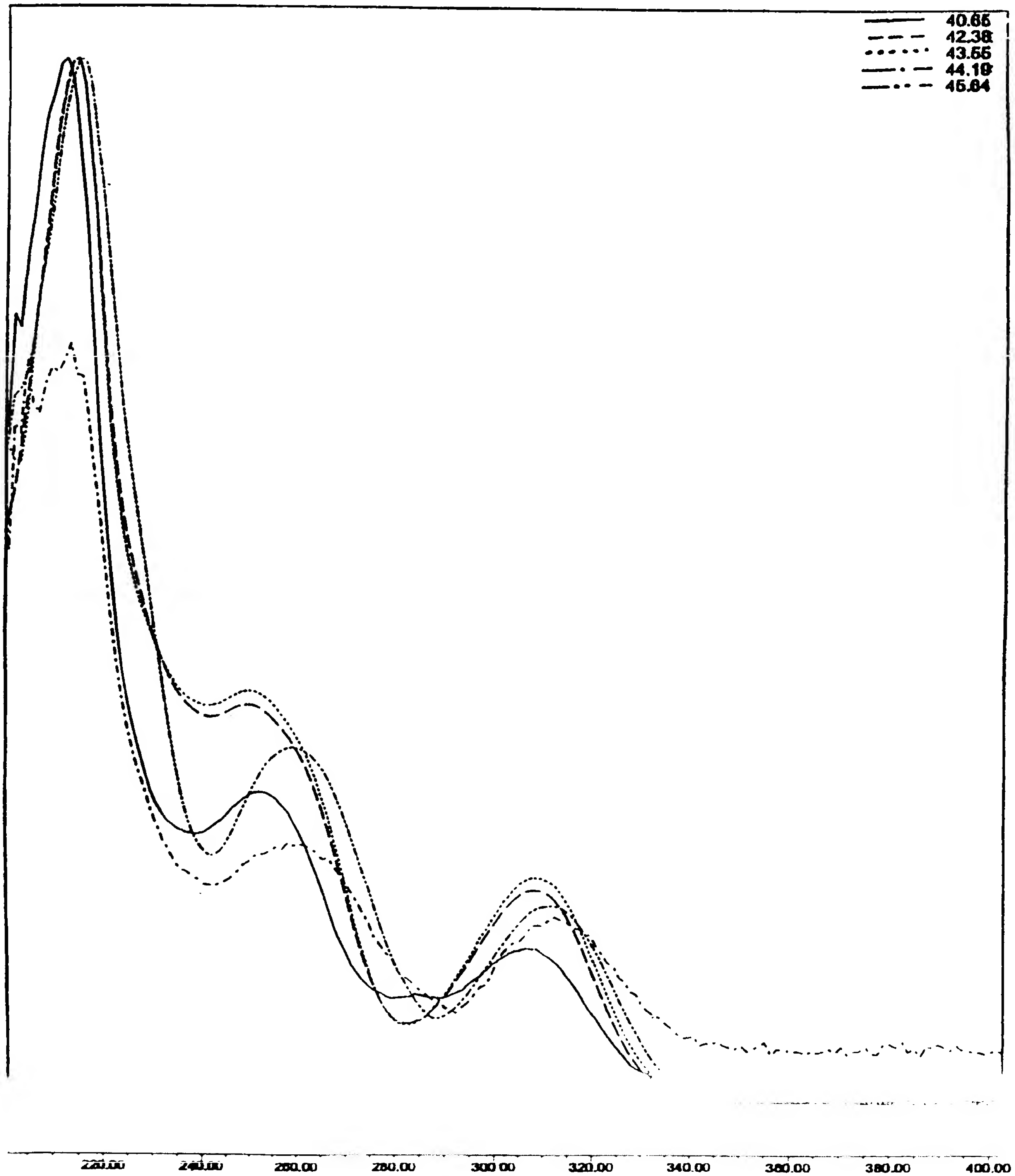

40.65
42.38
43.55
44.19
45.84
220.00
240.00
260.00
280.00
300.00
320.00
340.00
360.00
380.00
400.00

FIG. 13

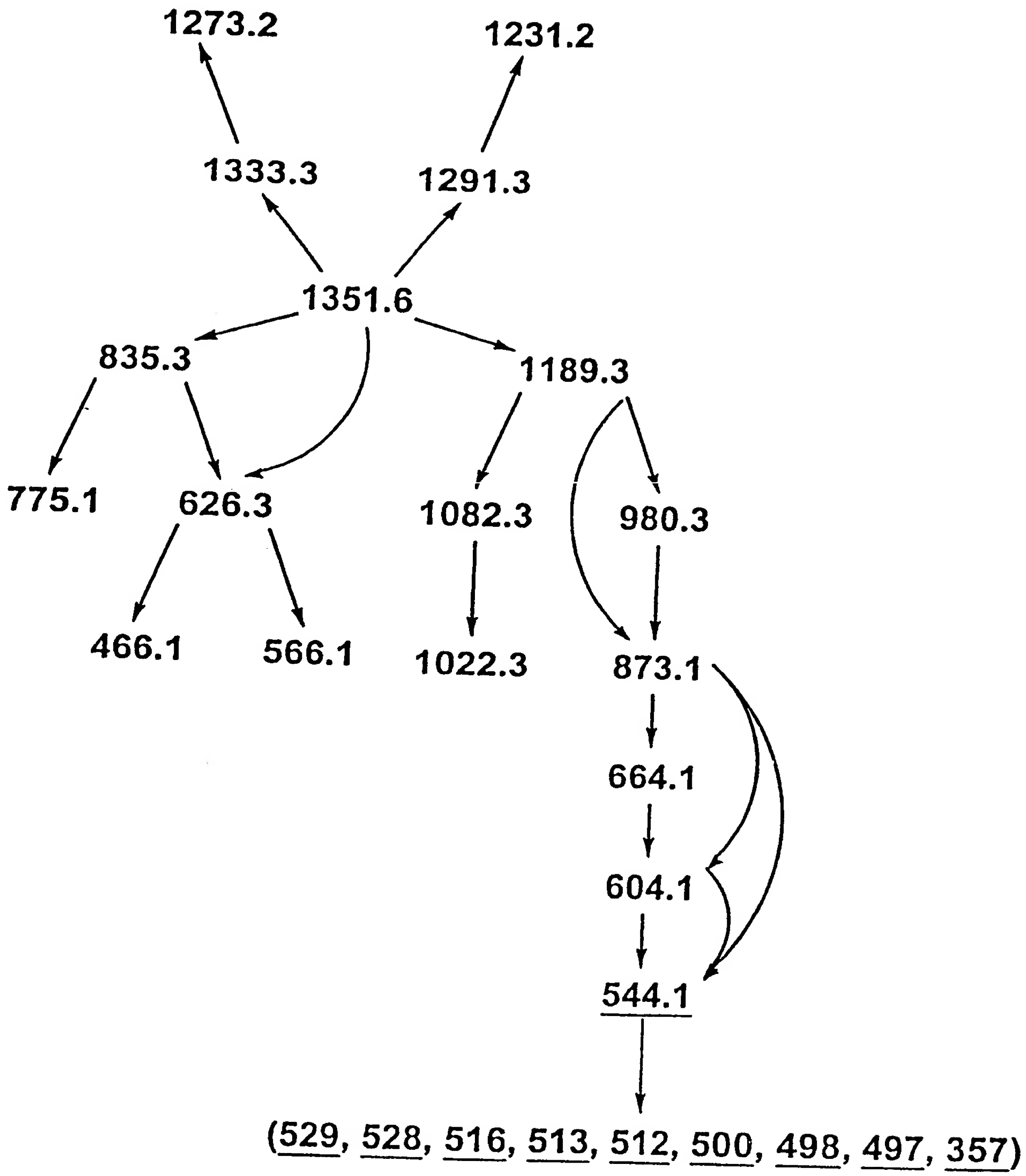

1273.2
1231.2
1333.3
1291.3
1351.6
835.3
1189.3
775.1
626.3
1082.3
980.3
466.1
566.1
1022.3
873.1
664.1
604.1
544.1
(529, 528, 516, 513, 512, 500, 498, 497, 357)

FIG. 14

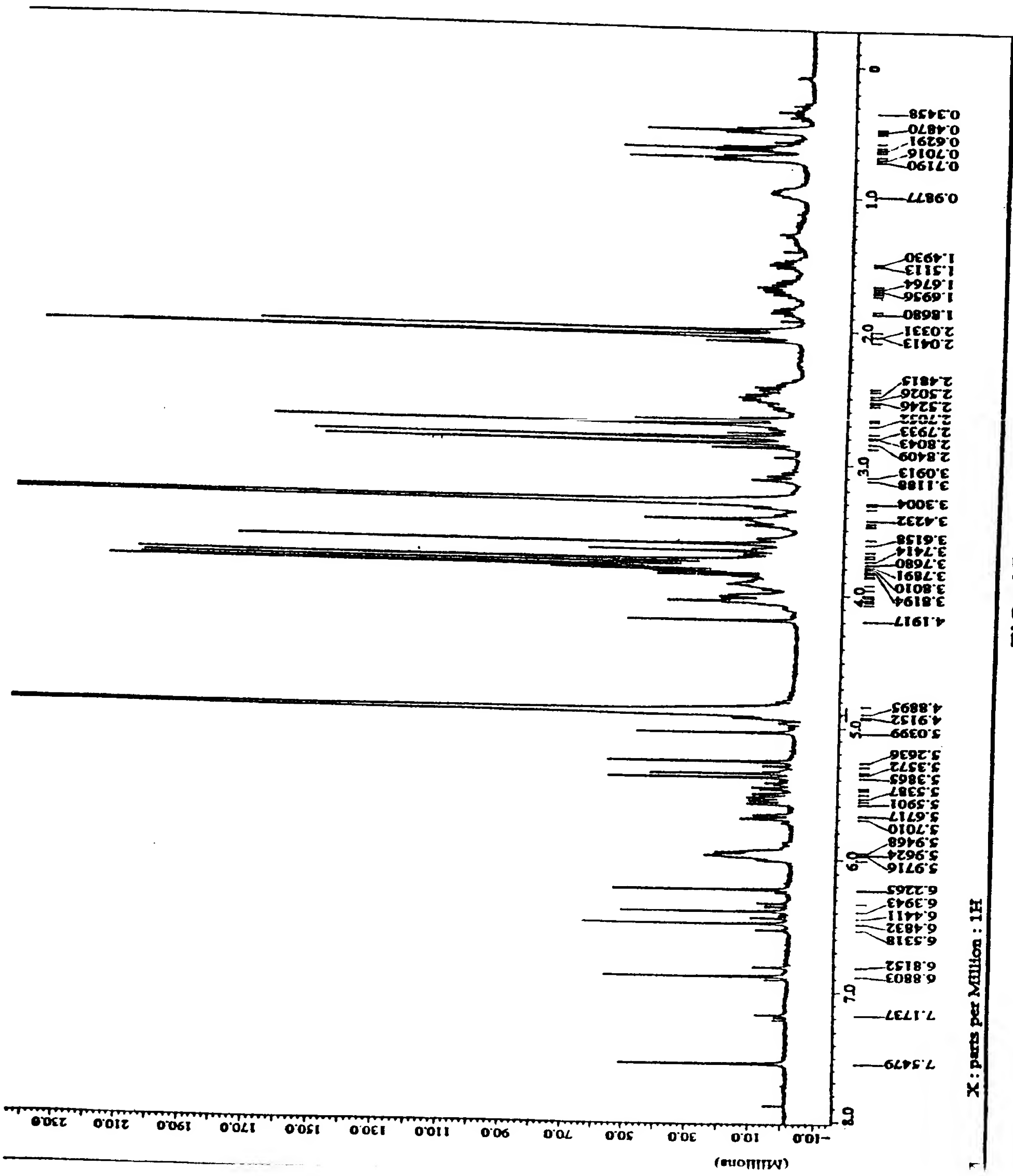

0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0.3458
0.4870
0.6291
0.7016
0.7190
0.9877
1.4930
1.5113
1.6764
1.6956
1.8680
2.0331
2.0413
2.4815
2.5026
2.5246
2.7032
2.7933
2.8043
2.8409
3.0913
3.1188
3.3004
3.4232
3.6158
3.7414
3.7680
3.7891
3.8010
3.8194
4.1917
4.8895
4.9152
5.0399
5.2636
5.3572
5.3865
5.5387
5.5901
5.6717
5.7010
5.9468
5.9624
5.9716
6.2265
6.3943
6.4411
6.4832
6.5318
6.8152
6.8803
7.1737
7.5479
X : parts per Million : 1H
-10.0
10.0
30.0
50.0
70.0
90.0
110.0
130.0
150.0
170.0
190.0
210.0
230.0
(Millions)

FIG. 15

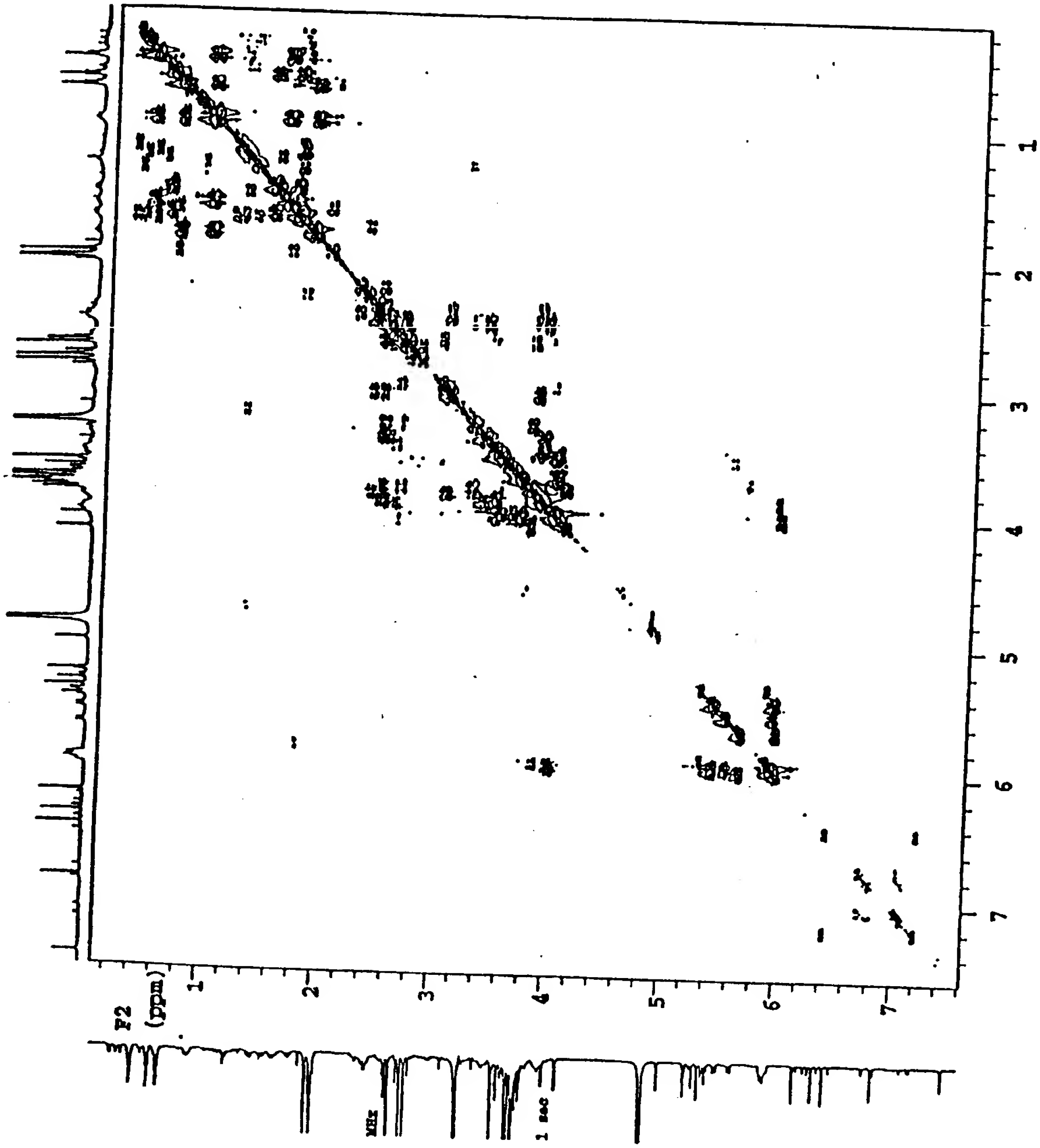


FIG. 16

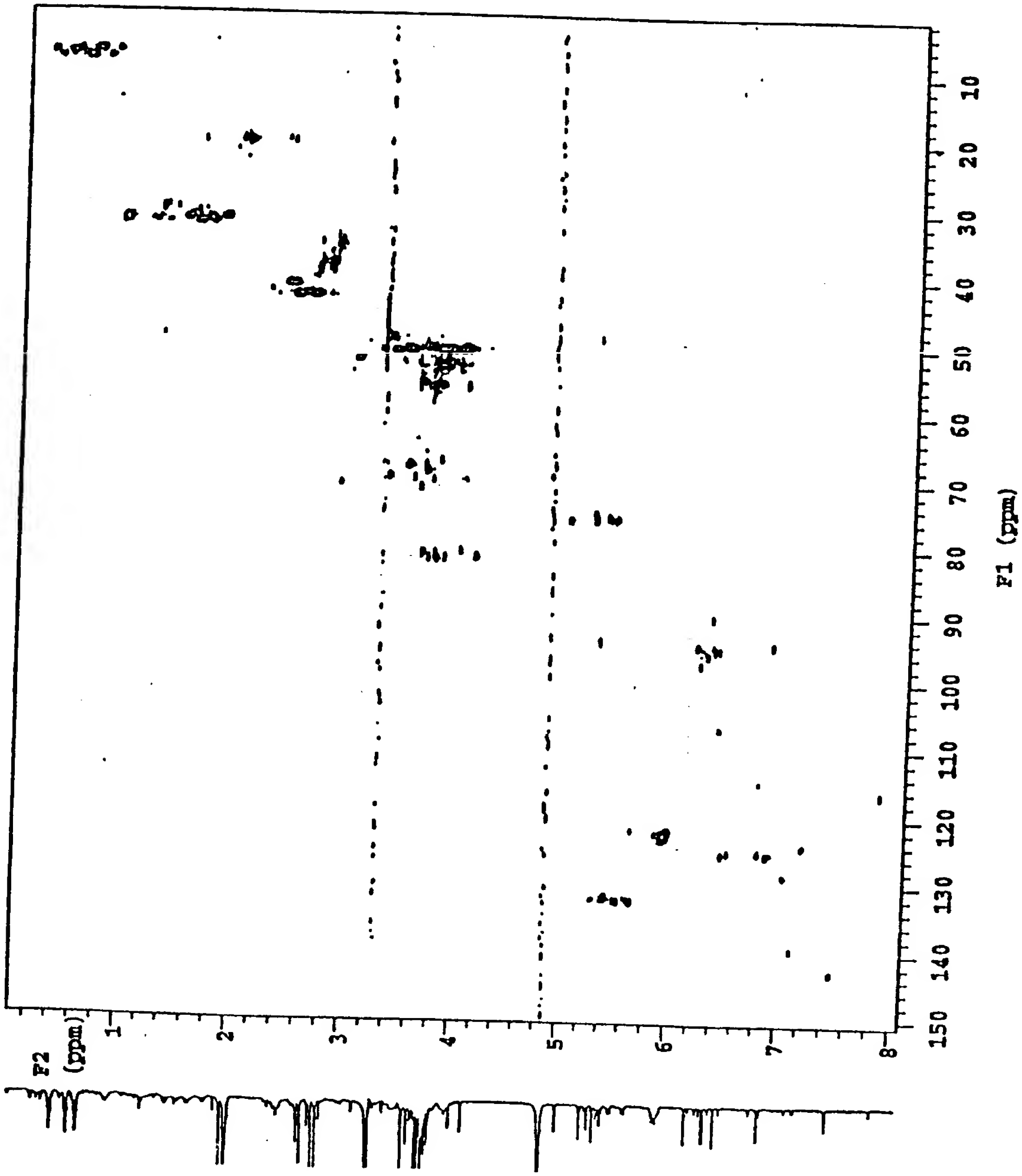
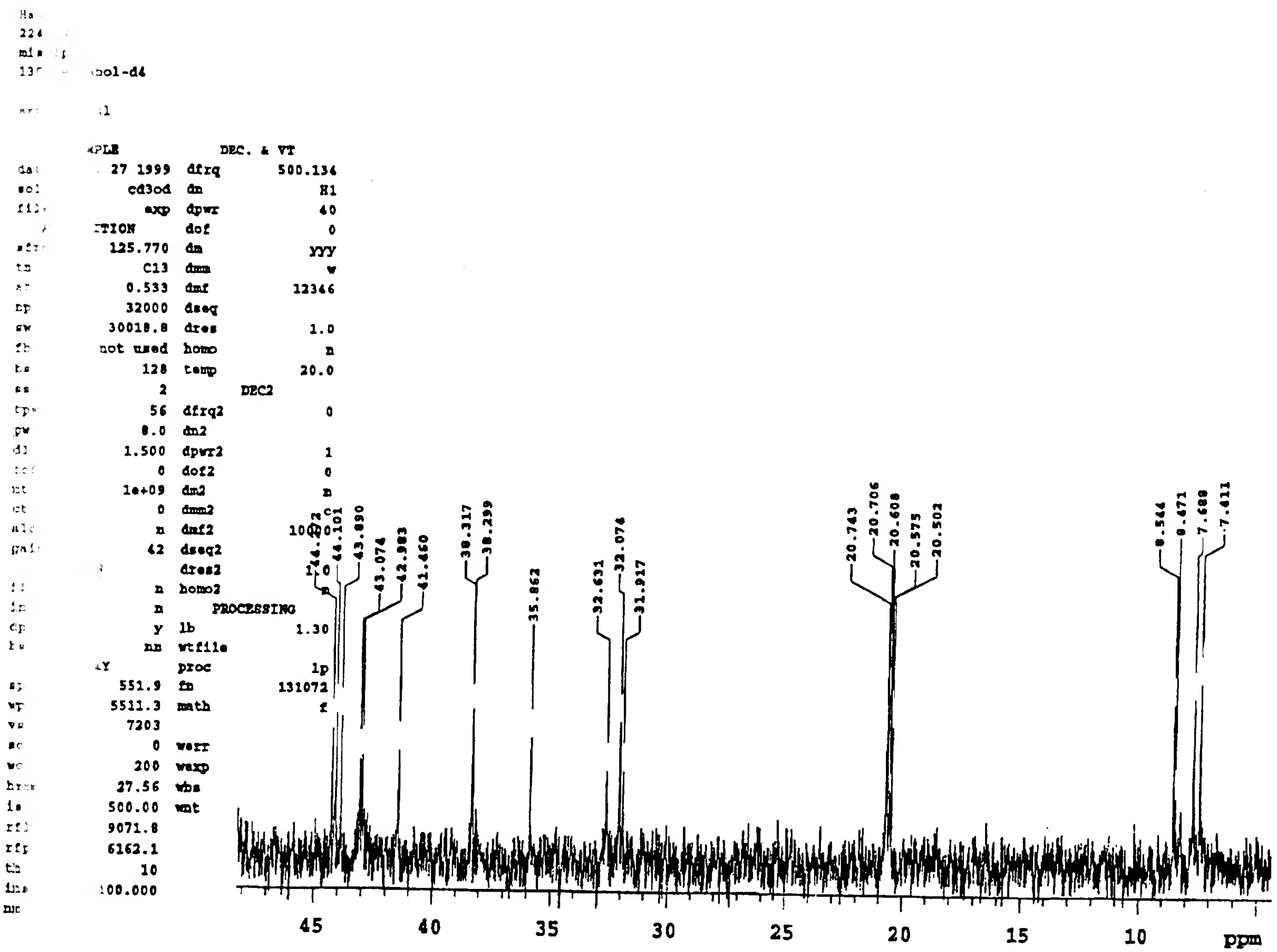

F2 (ppm)
1
2
3
4
5
6
7
8
F1 (ppm)
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150

FIG. 17

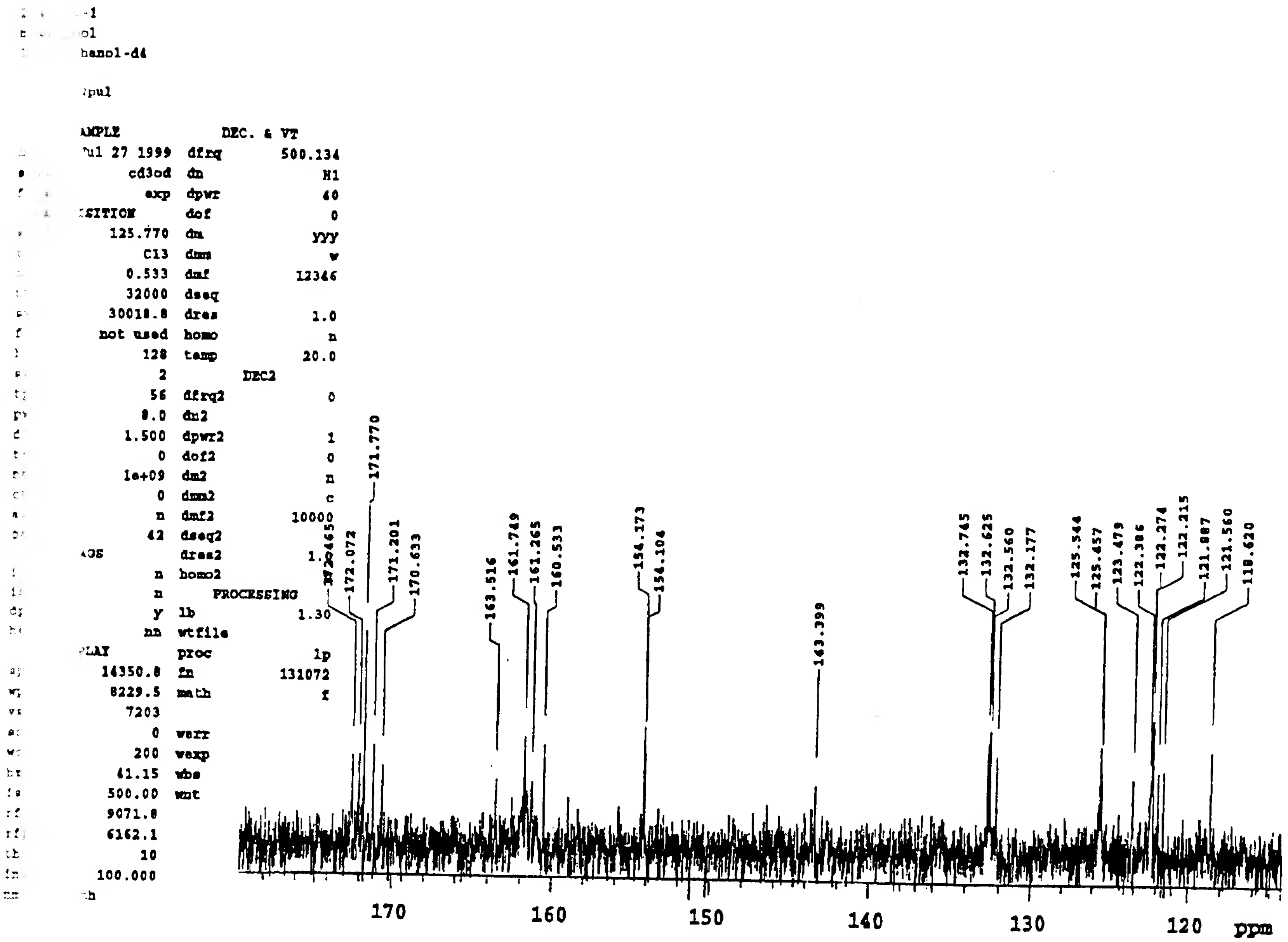


```
Ha
224
mis
13C       ool-d4

ar        l

          PLE           DEC. & VT
da        27 1999  dfrq        500.134
sol        cd3od  dn               H1
fil          exp  dpwr             40
          ITION    dof               0
sfr      125.770  dm              yyy
tn           C13  dmm               w
at         0.533  dmf           12346
np         32000  dseq
sw       30018.8  dres            1.0
fb      not used  homo              n
bs           128  temp           20.0
ss             2          DEC2
tp            56  dfrq2             0
pw           8.0  dn2
d1         1.500  dpwr2             1
to             0  dof2              0
nt         1e+09  dm2               n
ct             0  dmm2              c
al             n  dmf2          10000
ga            42  dseq2
                  dres2           1.0
il             n  homo2             n
in             n       PROCESSING
dp             y  lb             1.30
hs            nn  wtfile
          Y       proc             lp
sp         551.9  fn           131072
wp        5511.3  math              f
vs          7203
sc             0  werr
wc           200  wexp
hz         27.56  wbs
is        500.00  wnt
rfl       9071.8
rfp       6162.1
th            10
ins      100.000
nm
```

FIG. 18A



```
      -1
      ol
      hanol-d4

      pul

      AMPLE               DEC. & VT
      ul 27 1999  dfrq      500.134
          cd3od  dn             H1
            exp  dpwr           40
      SITION     dof             0
        125.770  dm            yyy
            C13  dmm             w
          0.533  dmf         12346
          32000  dseq
        30018.8  dres          1.0
       not used  homo            n
            128  temp         20.0
              2         DEC2
             56  dfrq2           0
            8.0  dn2
          1.500  dpwr2           1
              0  dof2            0
          1e+09  dm2             n
              0  dmm2            c
              n  dmf2        10000
             42  dseq2
      AGS        dres2         1.
              n  homo2
              n      PROCESSING
              y  lb           1.30
             nn  wtfile
      LAY        proc           lp
        14350.8  fn         131072
         8229.5  math            f
           7203
              0  werr
            200  wexp
          41.15  wbs
         500.00  wnt
         9071.8
         6162.1
             10
        100.000
             h
```

FIG. 18B

```
  22-1
  pool
  thanol-d4

   s2pul

   SAMPLE               DEC. & VT
    Jul 27 1999  dfrq        500.134
          cd3od  dn               H1
            exp  dpwr             40
QUISITION        dof               0
        125.770  dm              yyy
            C13  dmm               w
          0.533  dmf           12346
          32000  dseq
        30018.8  dres            1.0
       not used  homo              n
            128  temp           20.0
              2          DEC2
             56  dfrq2             0
            8.0  dn2
          1.500  dpwr2             1
              0  dof2              0
          1e+09  dm2               n
              0  dmm2              c
              n  dmf2          10000
             42  dseq2
 LAGS            dres2           1.0
              n  homo2             n
              n       PROCESSING
              y  lb             1.30
             nn  wtfile
 SPLAY           proc             lp
         6257.4  fn           131072
         6446.2  math              f
           7203
              0  werr
            200  wexp
          32.23  wbs
         500.00  wnt
         9071.8
         6162.1
             10
        100.000
     ph
```

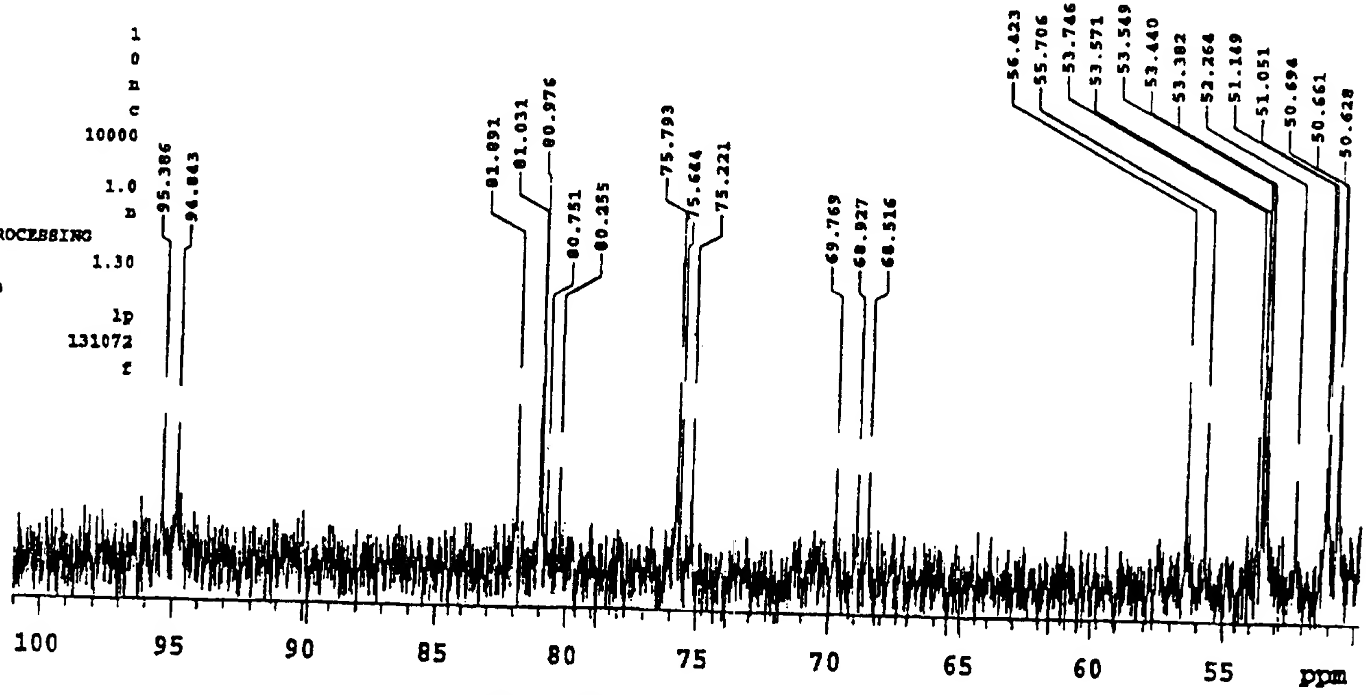


FIG. 18C

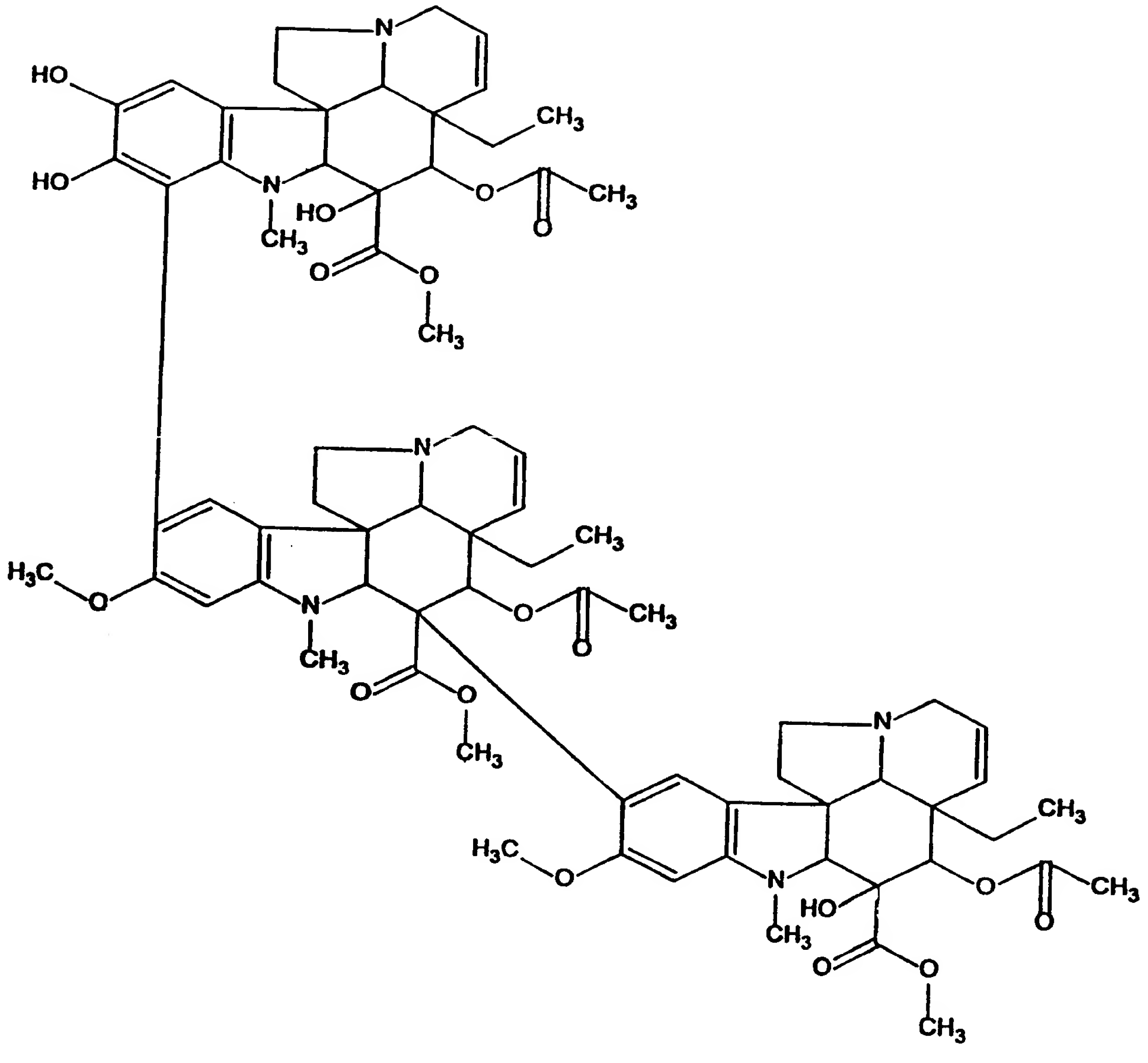

HO
HO
N
N
CH3
HO
CH3
O
O
CH3
O
O
CH3
H3C
O
N
N
CH3
CH3
O
O
CH3
O
O
CH3
H3C
O
N
N
CH3
HO
CH3
O
O
CH3
O
O
CH3

FIG. 19

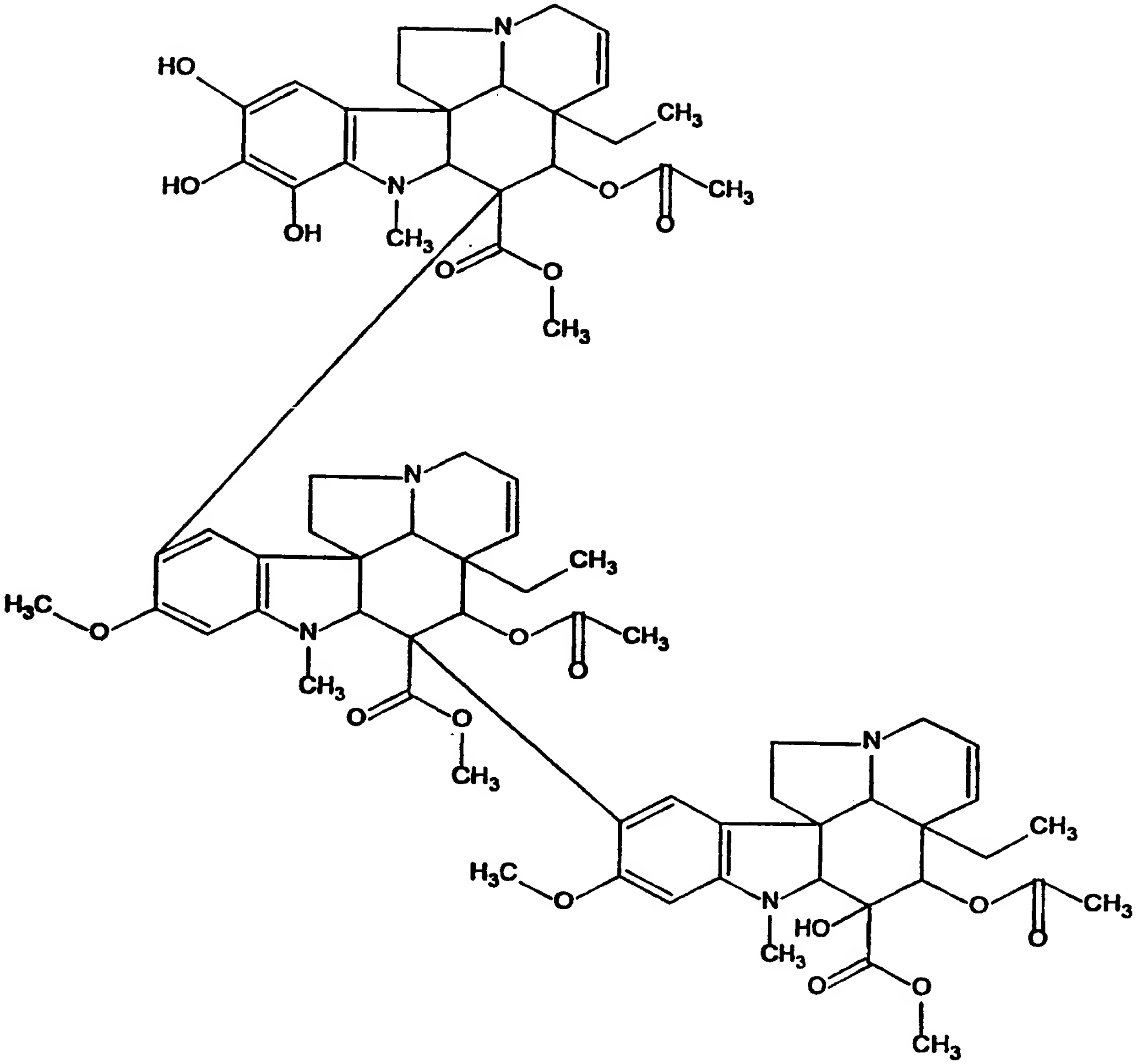

HO
HO
OH
N
CH3
N
CH3
O
CH3
O
O
O
CH3
H3C
O
N
CH3
N
CH3
O
CH3
O
O
O
CH3
H3C
O
N
CH3
N
CH3
HO
O
CH3
O
O
O
CH3

FIG. 20

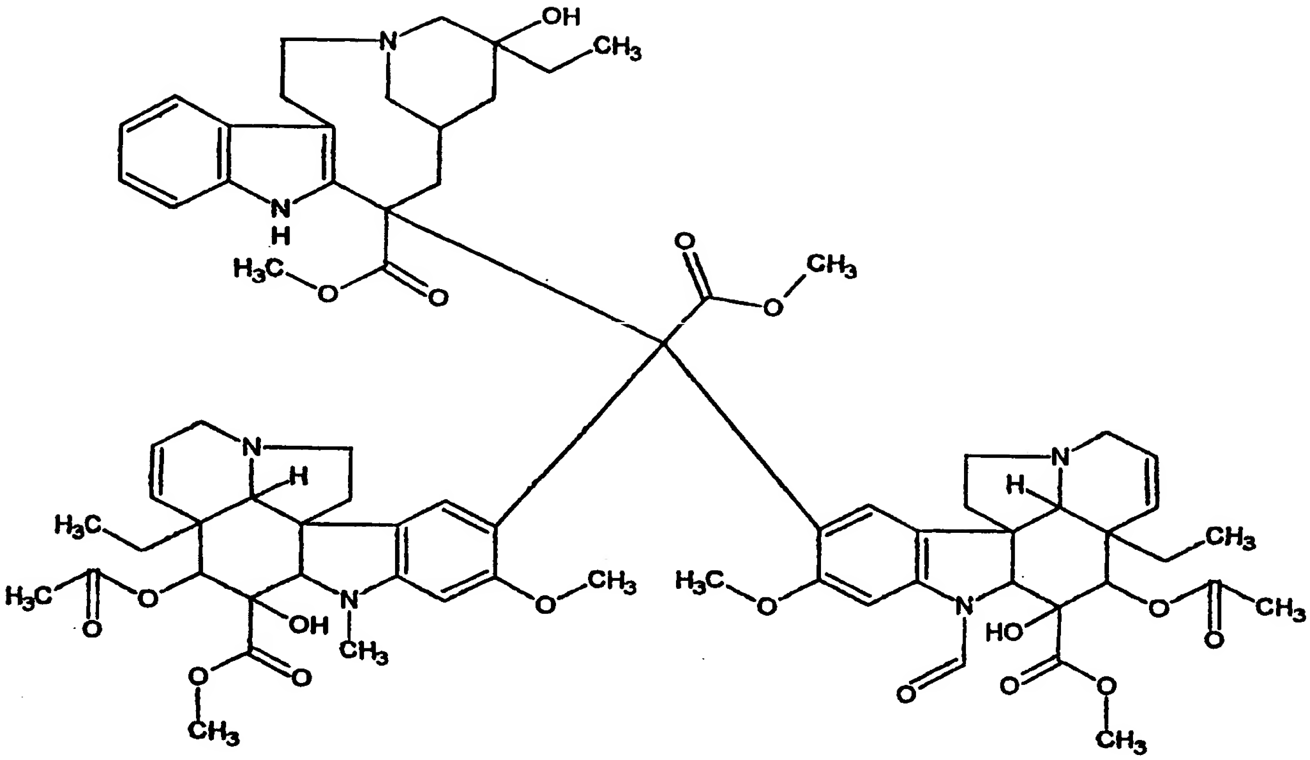

OH
CH3
N
N
H
H3C
O
O
O
CH3
O
O
N
H
H3C
H3C
O
O
OH
N
CH3
O
O
O
CH3
O
CH3
H3C
O
N
H
CH3
O
CH3
O
N
HO
O
O
O
O
CH3

FIG. 21

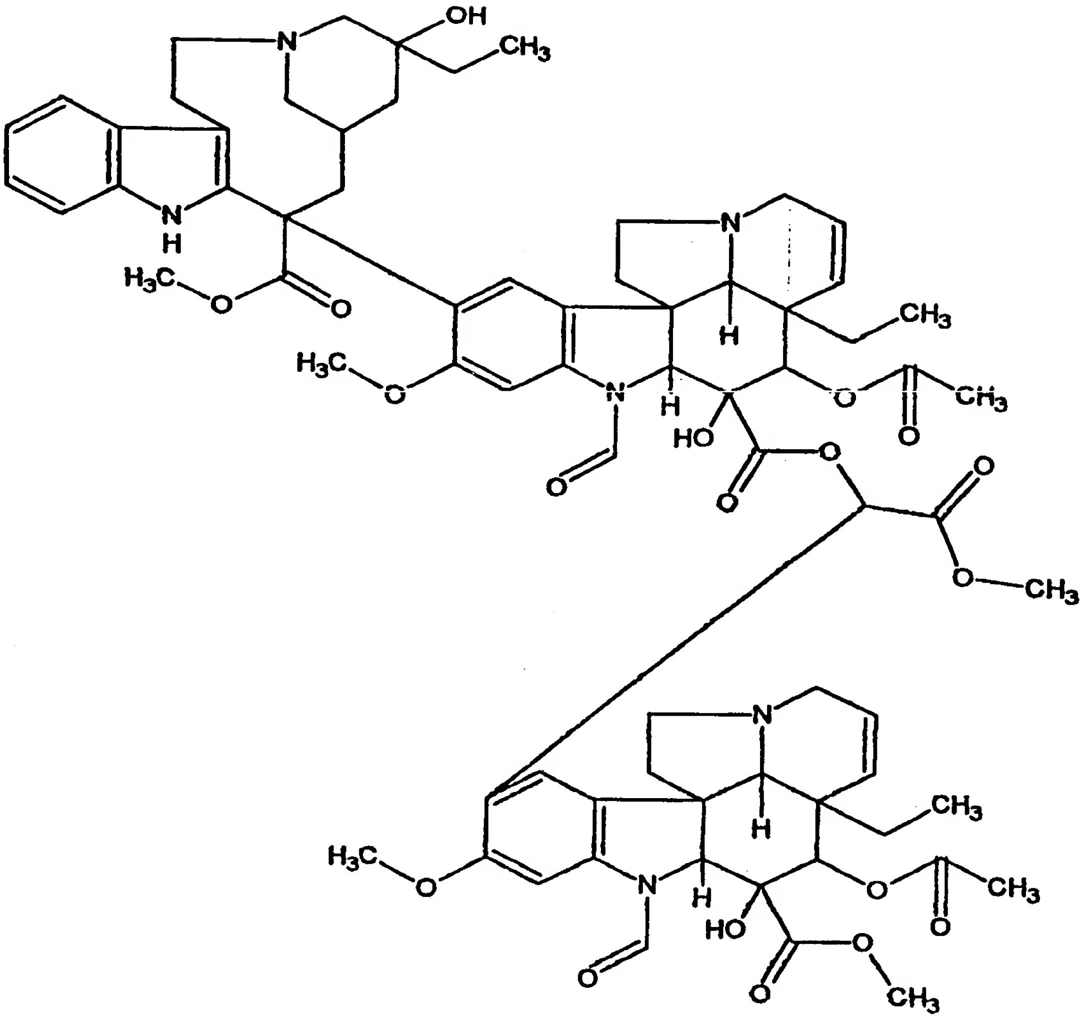

OH
CH3
N
N
H
H3C
O
O
N
CH3
H
H3C
O
N
H
O
CH3
O
HO
O
O
O
O
O
O
CH3
N
CH3
H
H3C
O
N
H
O
CH3
O
HO
O
O
O
CH3

FIG. 22